

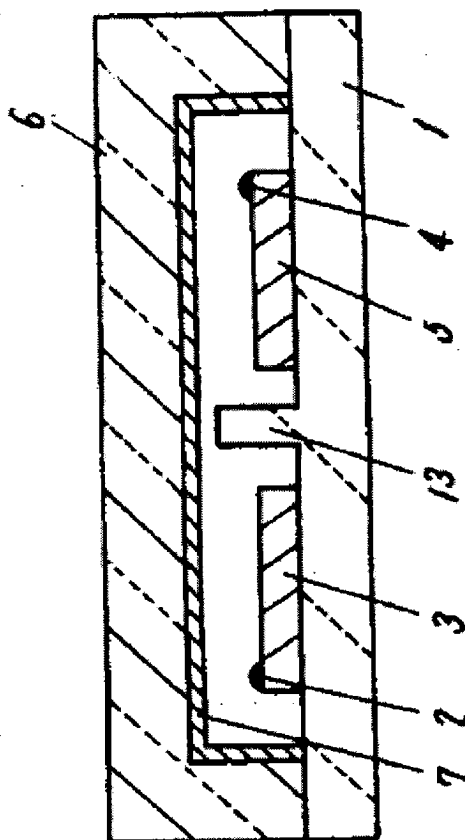
ELECTRONIC CIRCUIT DEVICE

Patent number: JP58039075
Publication date: 1983-03-07
Inventor: KUGIMIYA KOUICHI; others: 01
Applicant: MATSUSHITA DENKI SANGYO KK
Classification:
- **international:** H01L31/12
- **european:**
Application number: JP19810136859 19810831
Priority number(s):

Abstract of JP58039075

PURPOSE: To reduce the output of a light emitting element in an electronic circuit device which has an element for transmitting at least part of information via light by forming a reflecting film made of a dielectric film such as SiO₂ or Si₃N₄ on the inner surface of an alumina package, thereby effectively transmitting information between the elements even in the package of the electronic circuit of complicated shape.

CONSTITUTION: A semiconductor integrated circuit substrate 3 having a light emitting unit 2 is installed on an insulating substrate 1, and a semiconductor integrated circuit substrate 5 having a photodetector 4 is mounted on the substrate 1. A reflection film 7 which is made of substance that satisfactorily reflects the light such as semi-metal such as metal like Al or polycrystalline silicon is formed except the periphery of the part to mount the substrates 3, 5 on the inner surface of an enclosure 6 made of alumina or the like. The light emitted from the unit 2 is effectively arrived at the photodetector 4 even in weak light by the influence of the film 7, thereby enabling to transmit the signal from the substrate 3 to the substrate 5. Even if an obstacle such as projection 13 is existed in the package between the substrates 3 and 5, a light signal can be transmitted.



⑫ 公開特許公報 (A)

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H 01 L 31/12

識別記号

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⑬ 公開 昭和58年(1983)3月7日

発明の数 1
審査請求 未請求

(全 2 頁)

⑭ 電子回路装置

① 特 願 昭56—136859

② 出 願 昭56(1981)8月31日

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明 細 書

1、発明の名称

電子回路装置

2、特許請求の範囲

- (1) 発光素子および受光素子を内蔵し、内面の前記素子を装着する部分の周辺を少くとも除いて光反射膜を形成したことを特徴とする電子回路装置。
- (2) 反射膜の少なくとも一部が金属、半金属又は誘電体で構成されていることを特徴とする特許請求の範囲第1項に記載の電子回路装置。

3、発明の詳細な説明

本発明は、少なくとも一部の情報伝達を光で行う素子を包む電子回路装置のパッケージに関する。

従来、特に IC などにおいては、IC 内の同一チップ上や異なるチップ上の素子間の情報伝達にはポリシリコン配線や金の細線を配線することによって行ってきた。これには、配線による工程増加、容量や抵抗増加、インピーダンス整合などの難しい問題をかかえている。これを解決し、かつ高速で動作しうる光素子（少なくとも発光素子

受光素子を含む）を結合することが現在考えられ、一部は、近距離での通信などに使用されている。

本発明者らは、一つのパッケージ内におさめられたチップ（複数も含む）の情報伝達を光で行うことに着目し、本発明はかかる検討にもとづいてなされたものである。

ところで、セラミックパッケージ内に発光、受光素子を形成したチップを設置したものにおいても、発光素子からの光はアルミナ等のパッケージの内面等を反射しながらパッケージの空間内を伝達され、同一パッケージ内の受光素子に入射され、光による信号伝達は可能である。さらに、この構造において、アルミナパッケージの内面に SiO_2 や Si_3N_4 のような誘電体膜よりなる反射膜を形成すると、発光素子の出力を約1/2に少なくしても受光素子へ同一の S/N 比を有する信号伝達が可能となった。こうした反射膜を形成しない場合は、1/2の出力では光量が少なく受光素子は動作し得ず情報伝達は不可能であった。

図はこうした現象をもとにした本発明の一実施

例にかかる電子回路パッケージの概略構造を示すものである。1は絶縁基体で、この上に電子回路素子たとえば発光部2を有する半導体集積回路基板3が設置され、さらに基体1上には他の電子回路素子たとえば受光部4を有する半導体集積回路基板5が設置されている。6はアルミナ等からなる外周器で、その内面にはAl等の金属や多結晶シリコン膜等の半金属のように光をよく反射する物質よりなる反射膜7が形成されており、たとえばこの膜7は基板3, 5を接着する部分の周辺を除いて形成されている。すなわち、反射膜7は基板3, 5と基体1が接触しない面に全面形成してもよいが、基板3, 5を接着する部分には通常ボンディング用のメタライジングがあるので、この部分との重なりを避けるため、基板3, 5の接着部分には反射膜7を形成しない方が望ましい。また、基体1上には外部との接続のための電極配線が形成されているが、この部分上にも反射膜7は形成しない方が望ましい。なお、反射膜7は前述した誘電体膜でもよい。

図に示した構造によれば、発光部2から発せられた光は反射膜7の影響により弱い発光であっても確実に受光部4に到達し、確実に基板3から基板5への信号伝達が可能となる。さらに、本発明によれば基板3, 5間に突起物13等の障害物がパッケージ内に存在しても光になる信号伝達は可能となる。通常このような突起物13があるとこの部分上に配線を形成して基板3, 5間の電氣的接続を行うことは困難である。しかるに、本発明によれば内面の反射膜7により確実に基板3, 5間の信号伝達が可能となる。

以上のように、本発明によれば複雑な形状の電子回路パッケージにおいても素子間の情報伝達が確実に行え、かつ発光素子の発光出力を減少させることができ、有用な電子回路パッケージの実現に大きく寄与するものである。

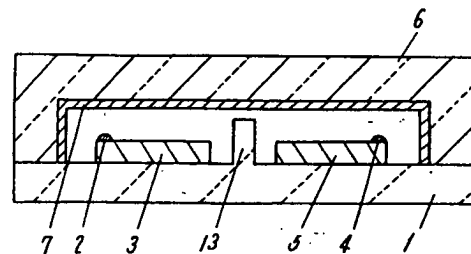
4、図面の簡単な説明

図は本発明の一実施例にかかる電子回路パッケージの概略構造断面図である。

1 …… 基体、2 …… 発光部、3, 5 ……

5
半導体、4 …… 受光部、6 …… 外周器、7 …… 反射膜。

代理人の氏名 弁理士 中 尾 敏 男 ほか1名



CPEL0150521P

Patent Office of the People's Republic of China

Address : Receiving Section of the Chinese Patent Office, No. 6 Tucheng Road West, Haidian District, Beijing, Postal code: 100088.

Applicant	OSRAM OPTO SEMICONDUCTORS GMBH & CO OHG		Seal of Examiner	Date of Issue
Agent	China Patent Agent (H.K.) Ltd.			January 9, 2004
Patent Application No.	99810736.0	Application Date	July 9, 1999	Exam Dept.
Title of Invention	ENCAPSULATION OF A DEVICE			

First Office Action

(PCT application entering into the national phase)

1. ☒ Under the provision of Art. 35, para. 1 of the Patent Law, the examiner has made an examination as to substance of the captioned patent application for invention upon the request for substantive examination filed by the applicant.
- ☐ Under the provision of Art. 35, para. 2 of the Patent Law, the Chinese Patent Office has decided to conduct an examination of the captioned patent application for invention on its own initiative.
2. ☐ The applicant requests that
 - the filing date _____ at the _____ Patent Office be taken as the priority date of the present application,
 - the filing date _____ at the _____ Patent Office be taken as the priority date of the present application,
 - the filing date _____ at the _____ Patent Office be taken as the priority date of the present application.
3. ☐ The following amended documents submitted by the applicant cannot be accepted for failure to conform with Art. 33 of the Patent Law:
 - ☐ the Chinese version of the annex to the international preliminary examination report.
 - ☐ the Chinese version of the amended documents submitted according to the provision of Rule 19 of the Patent Cooperation Treaty.
 - ☐ the amended documents submitted according to the provision of Rule 28 or Rule 41 of the Patent Cooperation Treaty.

☐ the amended documents submitted according to the provision of Rule 51 of the Implementing Regulations of the Patent Law.

See the text portion of this Office Action for detailed reasons why the amendment cannot be accepted.

4. ☒ Examination is conducted on the Chinese version of the initially-submitted international application.

☐ Examination is conducted on the following document(s):

☐ page _____ of the description, based on the Chinese version of the initially-submitted international application documents;

page _____ of the description, based on the Chinese version of the annex to the international preliminary examination report;

page _____ of the description, based on the amended documents submitted according to the provision of Rule 28 or Rule 41 of the Patent Cooperation Treaty;

page _____ of the description, based on the amended documents submitted according to the provision of Rule 51 of the Implementing Regulations of the Patent Law.

☐ claim(s) _____, based on the Chinese version of the initially-submitted international application documents;

claim(s) _____, based on the Chinese version of the amended documents submitted according to the provision of Rule 19 of the Patent Cooperation Treaty;

claim(s) _____, based on the Chinese version of the annex to the international preliminary examination report;

claim(s) _____, based on the amended documents submitted according to the provision of Rule 28 or Rule 41 of the Patent Cooperation Treaty;

claim(s) _____, based on the amended documents submitted according to the provision of Rule 51 of the Implementing Regulations of the Patent Law.

☐ Fig(s) _____, based on the Chinese version of the initially-submitted international application documents;

Fig(s) _____, based on the Chinese version of the annex to the international preliminary examination report;

Fig(s) _____, based on the amended documents submitted according to the provision of Rule 28 or Rule 41 of the Patent Cooperation Treaty;

Fig(s) _____, based on the amended documents submitted according to the provision of Rule 51 of the Implementing Regulations of the Patent Law.

5. ☒ The following reference document(s) is/are cited in this Office Action (its/their serial

number(s) will continue to be used in the subsequent course of examination):

Serial No.	Number or Title(s) of Document(s)	Date of Publication (or filing date of interfering application)
1	JP 58-39075A	Date March 7, 1983
2		Date
3		Date
4		

6. Concluding comments on the examination:

☒ On the description:

☐ What is stated in the application comes within the scope of that no patent right shall be granted as prescribed in Art. 5 of the Patent Law.

☐ The description is not in conformity with the provision of Art. 26, para. 3 of the Patent Law.

☐ The drafting of the description is not in conformity with the provisions of Rule 18 of the Implementing Regulations.

☒ The drafting of the description is not in conformity with the provisions of Rule 19 of the Implementing Regulations.

☒ On the claims:

☒ Claim(s) 1, 20, 30 has/have no novelty as prescribed in Art. 22, para. 2 of the Patent Law.

☒ Claim(s) 2-5, 21, 31-33 has/have no Inventiveness as prescribed in Art. 22, para. 3 of the Patent Law.

☐ Claim(s) _____ has/have no practical applicability as prescribed in Art. 22, para. 4 of the Patent Law.

☒ Claim(s) 26 is/are not in conformity with the provision of Art. 26, para. 4 of the Patent Law.

☐ Claim(s) _____ is/are not in conformity with the provision of Art. 31, para. 1 of the Patent Law.

☒ Claim(s) 6, 9, 11, 13, 16, 18, 19 is/are not in conformity with the provisions of Rules 20 to 23 of the Implementing Regulations.

See the text portion of this Office Action for detailed analysis of the above concluding comments.

7. Based on the above concluding comments, the examiner deems that

- ☐ the applicant should make amendment to the application document(s) according to the requirements put forward in the text portion of this Office Action.
- ☒ the applicant should expound in his/its observations why the captioned patent application is patentable and make amendment to what is not in conformity with the provisions pointed out in the text portion of this Office Action, otherwise, no patent right shall be granted.
- ☐ the patent application contains no substantive content(s) for which a patent right may be granted, if the applicant has no sufficient reason(s) to state or his/its stated reason(s) is/are not sufficient, said application will be rejected.
- ☐

8. The applicant should note the following items:

- (1) Under Art. 37 of the Patent Law, the applicant should submit his/its observations within four months from the date of receipt of this Office Action; if, without any justified reason(s), the time limit for making written response is not met, said application shall be deemed to have been withdrawn.
 - (2) The amendment made by the applicant to said application should be in conformity with the provision of Art. 33 of the Patent Law, the amended text should be in duplicate and its form should conform with the related provisions of the Guide to Examination.
 - (3) If no arrangement is made in advance, the applicant and/or the agent shall not come to the Chinese Patent Office to have an interview with the examiner.
 - (4) The observations and/or amended text should be sent to the Receiving Section of the Chinese Patent Office by mail or by personal delivery. If not sent to the Receiving Section by mail or by personal delivery, the document(s) will have no legal effect.
9. This Office Action consists of the text portion totalling 2 page(s) and of the following attachment(s):
- ☒ 1 copy(copies) of the reference document(s) totalling 2 page(s).

Examination Dept. No. 9
9016

Examiner Wu Xiao-da